

# FIVE NEW VARIETIES OF *AGAPETES* (ERICACEAE) FROM INDIA

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## ABSTRACT

Five new varieties of the genus *Agapetes* D. Don ex G. Don from Arunachal Pradesh, Mizoram and Nagaland, India are described and illustrated.

KEY WORDS: *Agapetes*, new varieties, Arunachal Pradesh, Mizoram, Nagaland, India

## RESUMEN

Se describen e ilustran cinco nuevas variedades del género *Agapetes* D. Don ex G. Don de Arunachal Pradesh, Mizoram y Nagaland, India.

The genus *Agapetes* D. Don ex G. Don (Ericaceae) comprises ca. 95 species (Mabberley 1997) or ca. 80 species (Ruizheng & Stevens et al. 2005) and is distributed from the E Himalayas through SW China and Indochina to SE Asia. In India, the genus comprised ca. 34 species (Santapau & Henry 1973). Presently in India there are 58 species and 15 varieties under the genus *Agapetes*.

A revision of the genus *Agapetes* for the Flora of India project has involved extensive field surveys in different states of North East India and studying herbarium specimens at various Indian herbaria. During this critical study, five new varieties of *Agapetes* came to light; they are described and illustrated here.

**1. *Agapetes acuminata* D. Don ex G. Don var. *tipiensis* Banik & Sanjappa, var. nov. (Fig. 1).** TYPE: INDIA. ARUNACHAL PRADESH: West Kameng district, on the way from Tipi to Sessa, 1050 m, 23 Apr 2002 (fl), D. Banik 27953 (HOLOTYPE: CAL; ISOTYPES: ASSAM, CAL).

A varietate typica inflorescentia subumbellata, pedunculo brevior 2–3 mm longo, pedicello brevior 5–5.5 mm longo differt.

**Epiphytic** straggling shrubs, sometimes terrestrial, 0.5–1 m long. **Lignotubers** basal, amorphous in epiphytic ones. **Stems** robust, terete, obscurely striate, rugose, glabrous, densely lenticellate even when young; perulae 5–9, closely to loosely alternate, 4–6 mm apart, deltoid to linear, 0.5–2 × 0.2–1 mm, serrate at margins, acuminate at apex, scaly, caducous. **Leaves** loosely 2–3-stichous, 1.5–3 cm apart; petioles 0.7–1.5 cm long, obscurely rugose, slightly pulvinus at base, glabrous; lamina 10.5–25.5 × 2.5–7 cm, lanceolate to ovate-lanceolate, broadly cuneate to rounded at base, bluntly serrate (serratura 10–18 pairs) at margins, acutely acuminate (acumen 1–1.5 cm long) at apex, chartaceous, glabrous; veins depressed above, brochidodromous, secondary veins 10–18 pairs at 45°–60°, marginal vein 0.5–4 mm away from margins. **Inflorescences** axillary or cauline, subumbellate, 7–9-flowered, sparsely puberulous; peduncles 2–3 mm long; peduncular bracts 5–11, deltoid or boat-shaped, 0.5–1.5 × ca. 0.4 mm, acute at apex, scaly, caducous; pedicels crimson red, 5–5.5 mm long, obconical, ca. 3 mm broad at apex, fleshy, puberulous, articulate at the base of calyx; pedicellar bract 1, linear, 1–1.5 × 0.5–0.6 mm, serrate at margins, acuminate at apex, midvein raised outside, scaly, caducous; bracteoles 2, opposite, 0.5–1 × 0.2–0.3 mm, similar to bracts. **Calyx** crimson red, 2.5–3 × ca. 3.1 mm, puberulous; lobes deltoid ca. 1.3 × 1.5 mm, acute at apex. **Corolla** crimson red, urceolate, 3.5–4 × 4–4.5 mm; lobes 1–1.3 × 1–1.5 mm. **Stamens** whorled, 3–3.5 mm long; filaments linear, 1–1.5 mm long, slightly incurved, sparsely pilose; anthers 2–2.5 mm long including 1–1.1 mm long thecae, sparsely granular, tail obscure and tubules

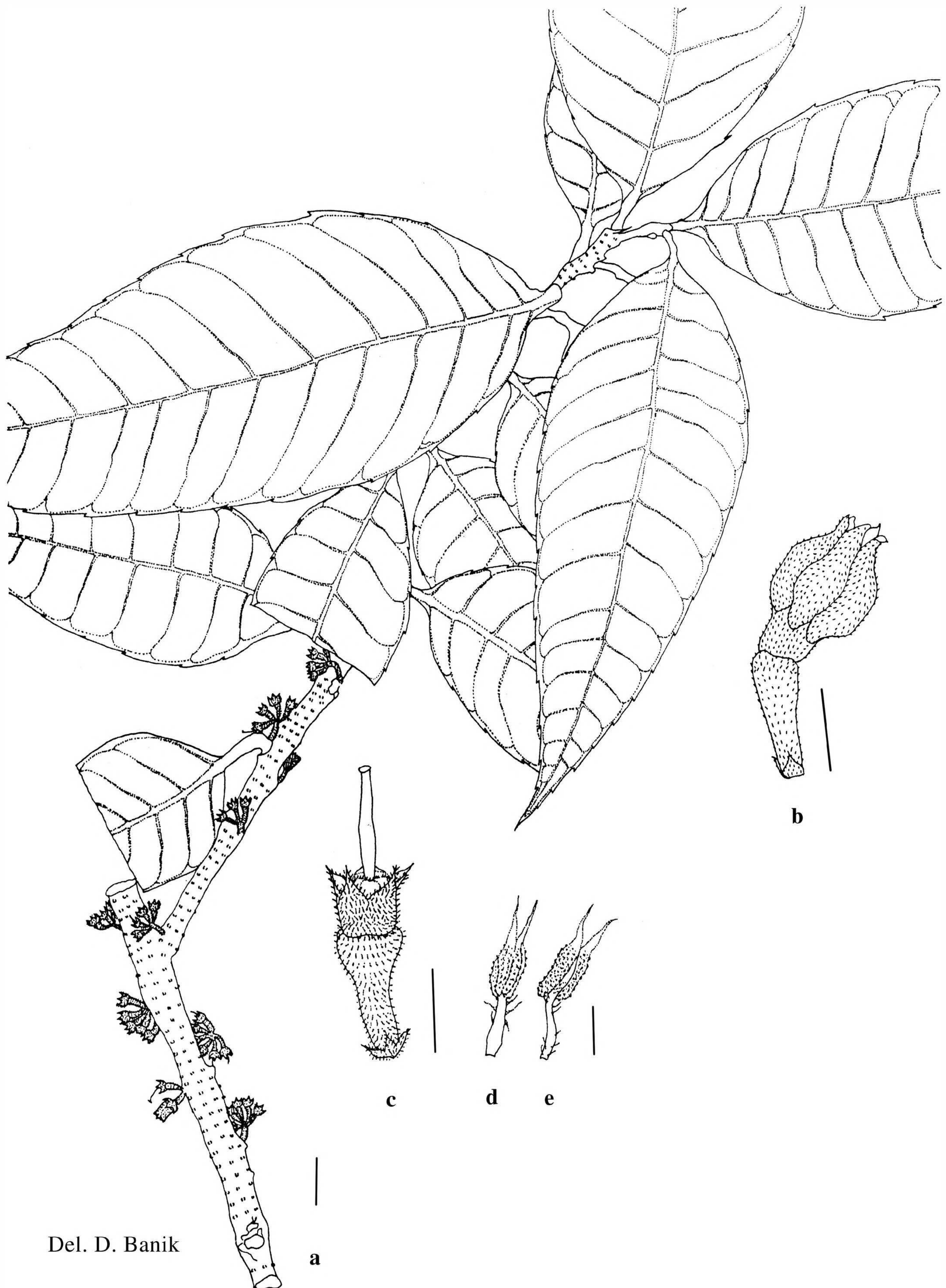


FIG. 1. *Agapetes acuminata* D. Don ex. G. Don var. *tipiensis* Banik & Sanjappa: a. habit; b. flower; c. calyx and style; d–e. stamens. Scale bars: a = 1 cm; b = 2 mm; c = 3 mm; d–e = 1 mm (a–e, D. Banik 27953).

1.3–1.4 mm long. **Style** cylindrical, 3.5–4 mm long, glabrous, slightly impressed inside ovary, caducous; stigma glandular-truncate. **Fruit** not seen.

*Notes.*—This variety differs from the typical variety in having subumbellate inflorescences, shorter peduncles (2–3 mm long) and pedicels (5–5.5 mm long) whereas the typical variety has corymbose inflorescences, 3.5–7 mm long peduncles and 1–1.6 cm long pedicels. Variety *tipiensis* is found in Arunachal Pradesh whereas the type variety occurs in Meghalaya (India), Bangladesh and Myanmar.

*Distribution and Habitat.*—India: Arunachal Pradesh. Common in the subtropical forests at altitudes ranging from 1050–1200 m.

*Flowering.*—April–June.

*Etymology.*—This variety is named after the type locality.

PARATYPE: **INDIA. Arunachal Pradesh:** West Kameng district, Aka hills, Jun 1934 (fl), *Bor 15741* (ASSAM).

**2. *Agapetes flava*** (Hook. f.) Sleumer var. ***nagensis*** Banik & Sanjappa, var. nov. (**Fig. 2**). TYPE: INDIA. NAGALAND: Naga (Barail) hills, above Konoma, 2100 m, Jul 1886 (fl), *D. Prain s.n.* (HOLOTYPE: CAL, 264391).

A varietate typica calycis lobis multo brevioribus 4–6 mm longis, ovato; foliis serrato, basi cuneato differt.

**Epiphytic** shrubs. Lignotubers basal, amorphous, 7–10 × 5–6 cm. **Stems** slender to robust, terete, striate, lenticellate, glabrous but sparsely puberulous when young. **Leaves:** pseudowhorls 2.2–4.5 cm apart, 2–3-leaved; petioles 3–6 × 1.5–2.5 mm, puberulous; lamina lanceolate to broadly elliptic, 7–8.5 × 1.7–3.8 cm, obtuse to cuneate at base, serrate and recurved at margins, acutely acuminate (acumen 0.8–1.7 cm long) at apex; veins depressed above, midvein puberulous at base, brochidodromous, 13–14 pairs of secondary veins at 60°–85°. **Inflorescences** axillary or cauline, corymbose or 5–6 flowers in fascicles, puberulous; peduncles 1–2.5 mm long; peduncular bracts 2–3, closely alternate, ovate to linear, 0.5–1 × ca. 0.5 mm; pedicels slender, 1.2–1.8 cm long, puberulous; pedicellar bract 1, triangular 1–1.5 × ca. 0.5 mm, puberulous; bracteoles 2, linear, 2–2.5 × ca. 0.5 mm, acuminate at apex, puberulous. **Calyx** winged, 8–10 × 4–4.5 mm, puberulous; lobes ovate, 4–6 × 2.5–3.5 mm, acute at apex. **Corolla** yellow, tubular-urceolate, (1.4–1.5)20–22 × 0.5–0.6 cm, puberulous; lobes broadly triangular, obscure or ca. 1 mm long. **Stamens** (1.4)1.8–2 cm long; filaments 1–2 mm long, ellipsoid, glabrous to sparsely puberulous outside; anthers (1.3)1.7–1.8 cm long including 4–4.5 mm long thecae, granular, tail ca. 0.5 mm long, slightly recurved, granular and tubules (0.9)1.3–1.4 cm long, obscurely calcarate, spurs obscure, basal to tubule. **Ovary** 3–4.5 mm in diameter; style slender, 1.4–1.6 cm long; stigma truncate. **Fruit** not seen.

*Distribution and Habitat.*—India: Nagaland. Grows in subtropical forests at ca. 2100 m.

*Flowering.*—June–August.

*Etymology.*—This variety is named after the type locality.

*Notes.*—This variety differs from the typical variety in having much shorter calyx lobes 4–6 mm long, ovate and leaves serrate, cuneate at base whereas the typical variety has calyx lobes 8–11 mm long, elliptic-lanceolate and leaves obscurely crenate, rounded at base. In typical variety the corolla tube almost is covered by calyx. Variety *nagensis* is found in Nagaland whereas the type variety is known from Arunachal Pradesh.

PARATYPES: **INDIA. Nagaland:** Naga (Barail) hills, above Konoma, Aug 1886 (fl), *D. Prain s.n.* (BSIS, 17874); *D. Prain s.n.* (fl), (CAL, 264390); *D. Prain s.n.* (fl) (CAL, 264392).

**3. *Agapetes megacarpa*** W.W. Sm. var. ***lohitensis*** Banik & Sanjappa, var. nov. (**Fig. 3**). TYPE: INDIA. ARUNACHAL PRADESH: Lohit district, Mailiang to Chipra, ca. 1400 m, 16 May 2003 (fl), *D. Banik 27534* (HOLOTYPE: CAL; ISOTYPES: ASSAM, CAL).

A varietate typica calycis lobis multo longioribus lineari-ellipticis 1.6–2.1 cm longis 3–5 mm latis differt.

**Epiphytic** or lithophytic shrubs, erect, 2–3 m high. **Lignotubers** basal, amorphous. **Stems** robust, terete, striate, lenticellate, glabrous; perulae 6–12, close to loosely alternate, ovate to linear-lanceolate, 5–10 × 2.5–6 mm, serrate at margins, acuminate at apex, caducous to persistent. **Leaves:** pseudowhorls 2.5–5 cm apart, 3–6-leaved; lamina sessile, elliptic or broadly elliptic, 12–18 × 2.7–6 cm, auriculate to

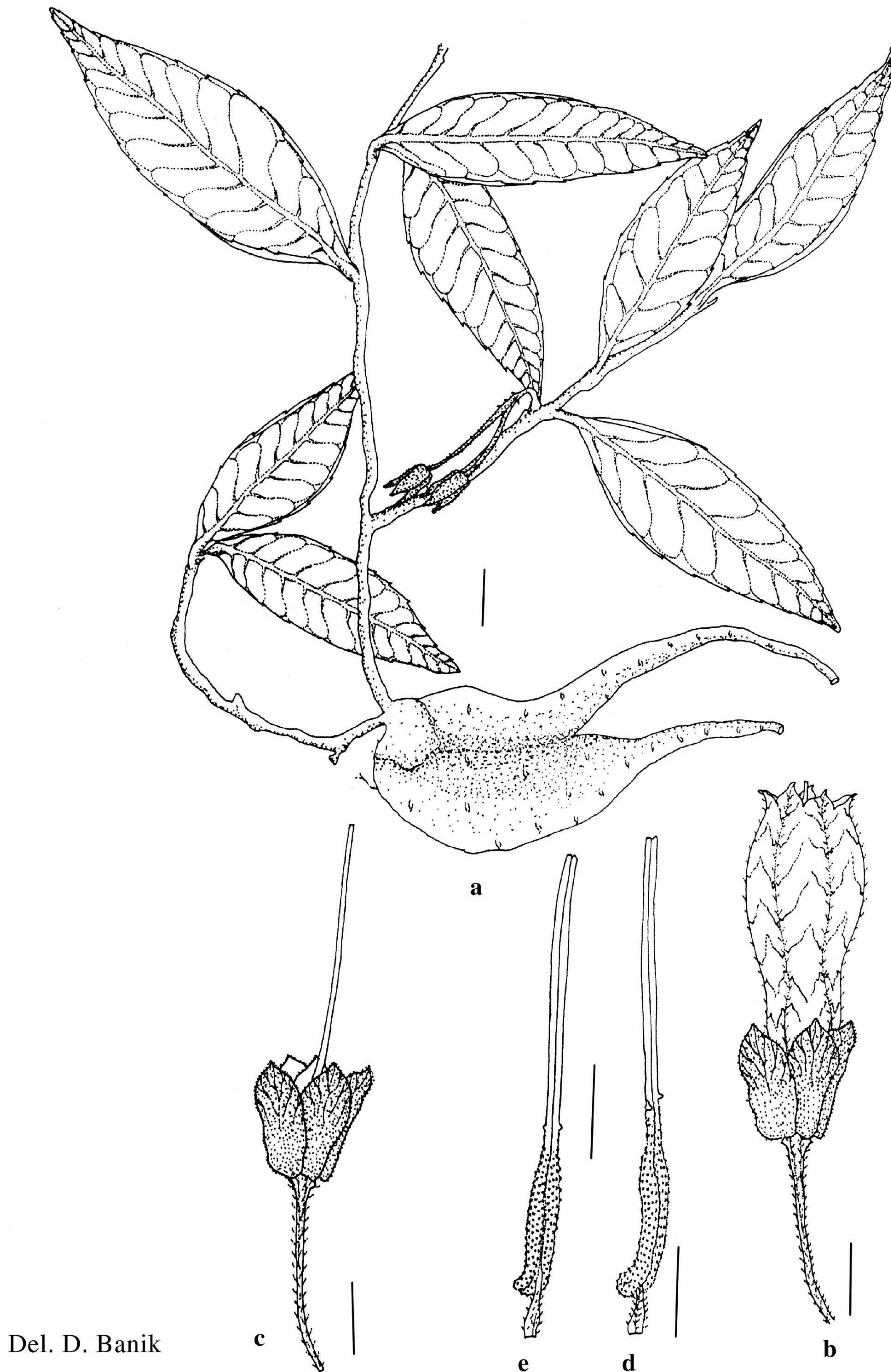
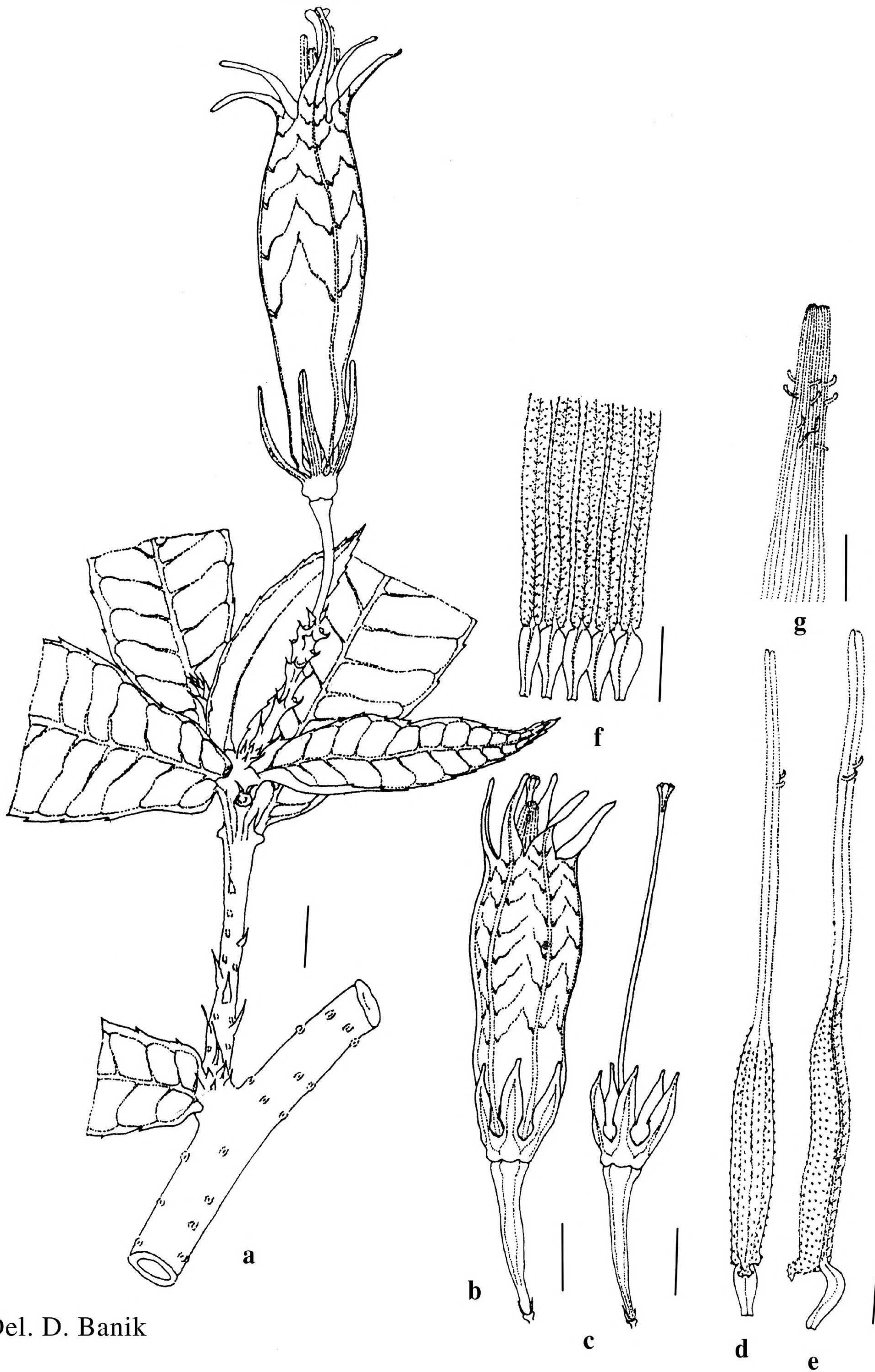


FIG. 2. *Agapetes flava* (Hook. f.) Sleumer var. *nagensis* Banik & Sanjappa: a. habit; b. flower; c. calyx and style; d–e. stamens. Scale bars: a = 1 cm; b–c = 5 mm; d–e = 3 mm [a–e, *D. Prain s.n.* (Herb. Acc. No. 264392)].



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FIG. 3. *Agapetes megacarpa* W.W. Sm. var. *lohitis* Banik & Sanjappa: a. habit; b. flower; c. calyx and style; d–e. stamens; f. basal portion of stamens; g. apical portion of tubules. Scale bars: a–c, f = 1 cm; d, e, g = 5 mm (a–g, D. Banik 27534).

cordate at base, entire to serrate at margins and obscurely recurved towards apex, acuminate to acutely acuminate (acumen 1–1.5 cm long) at apex, coriaceous, glaucous above, dull below; veins raised above, brochidodromus, 10–12 pairs of laterals at 45°–80°. **Inflorescences** axillary or pseudoterminal, corymbose, 6–15-flowered, glabrous, maroon, dealbatus; peduncles maroon, 1–1.5 cm long, 4–5 mm broad, stout, glabrous, dealbatus; peduncular bracts maroon, 5–6, linear, 1–1.5 × 0.5–0.6 cm, prominently veined, glabrous, dealbatus, caducous; rachis 3–3.5 cm long; pedicels 2–3-stichous, maroon, obconical, 2–3.2 cm long, 0.7–1 cm broad at apex, stout, glabrous, dealbatus; pedicellar bract 1, triangular, 3.5–4 × 1.5–2 mm, serrate, acute; bracteoles 2, opposite, linear, 2–3 × ca. 1 mm, serrate, acuminate, caducous. **Calyx** maroon, 2.3–2.5 × 1.5–1.6 cm, glabrous, rugose at base, dealbatus; lobes linear-elliptic, 16–21 × 3–5 mm, slightly constricted at base, entire at margins, acuminate to obtusely acuminate at apex, thickly coriaceous, 3–4 pairs of secondary veins at 15°–30°, raised above. **Corolla** maroon-red, tubular-urceolate, 5–6 × 1.5–2 cm, glabrous, dealbatus, 6–7 pairs of secondary veins at 30°–60°, dark maroon, directed upwards forming closed reticulations; lobes green, ovate-caudate or triangular-caudate, 15–16 × 6–6.5 mm, glabrous, dealbatus. **Stamens** 10, 2-whorled; filaments spathulate, 4.5–7 mm long, incurved, sparsely hirtellous outside; anthers 4.6–4.8 cm long including 1.1–1.5 cm long thecae, verrucate, tail 0.5–0.7 mm long, verrucate, reflexed and tubules 3.2–3.7 cm long, sparsely verrucate to smooth, calcarate, spurs apical on tubule, 0.5–0.7 mm long, verrucate, ascending and reflexed in adjacent anthers. **Style** slender, ca. 5.7 cm long; stigma 5-lobed, 2–3 × 2–2.5 mm. **Fruit** a berry, maroon, obovoid, 2.5–2.8 × 1.5–1.8 cm, glabrous, dealbatus. **Seeds** obovoid, 3–5 × 2–2.5 mm, pointed at base; seed coat reticulate.

*Distribution and Habitat.*—India: Arunachal Pradesh. Common in the subtropical forests at altitudes ranging from 1300–1500 m.

*Flowering and Fruiting.*—March–May.

*Etymology.*—This variety is named after the type locality.

*Uses.*—Corolla used as vegetable.

*Note.*—This variety differs from the typical variety in having much longer (1.6–2.1 cm) linear-elliptic calyx lobes whereas the typical variety has shorter (6.5–11 mm) ovate to lanceolate calyx lobes. Variety *lohitisensis* is found in Arunachal Pradesh whereas the typical variety is distributed in Nagaland (India), China, and Thailand.

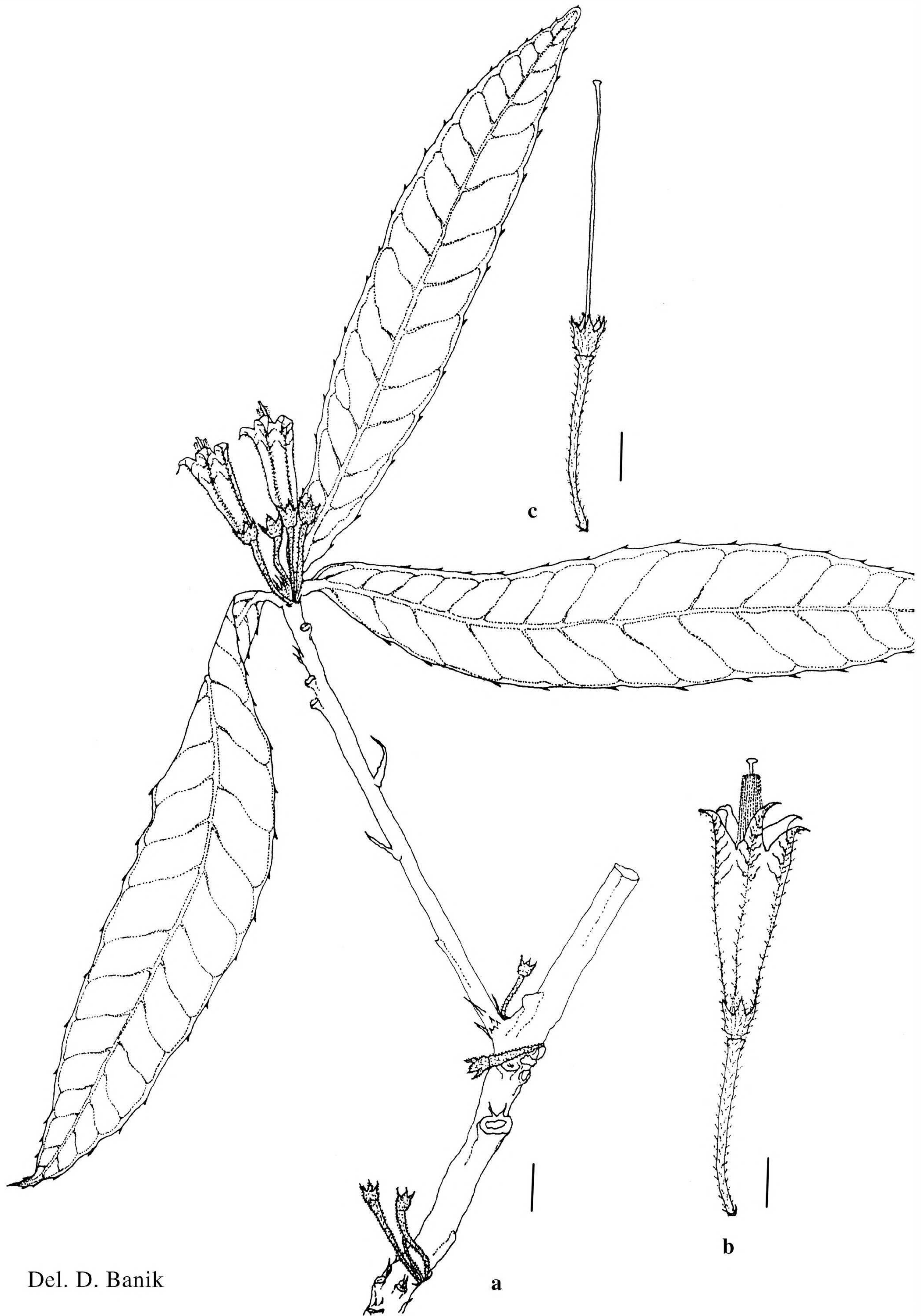
PARATYPES: **INDIA. Arunachal Pradesh:** Lohit district, Kuibang, 25 Mar 1986 (fl), *K. Haridasan* 2909 (APFH); Lailiang to Mailiang, near Lailiang, 1400–1500 m, 16 May 2003 (fl), *D. Banik* 27533 (CAL).

**4. *Agapetes odontocera* (Wight) Hook. f. var. *mizoramensis* Banik & Sanjappa, var. nov. (Fig. 4).** TYPE: INDIA: Mizoram, Thaltlang phui, 16 May 1990 (fl), *B.M. Wadhwa & K.P. Singh* 96834 (HOLOTYPE: ASSAM).

A varietate typica inflorescentia uniforme puberula differt.

Small **trees**. Stems robust, terete, obscurely striate, lenticellate, glabrous; perulae many, compactly alternate to loosely alternate (5–8 mm apart), triangular to linear-triangular. **Leaves:** pseudowhorls 4–5.5 cm apart, 3–5-leaved; petioles 1–2 mm long, glabrous; lamina narrowly elliptic-oblongate, 14–15 × 2.3–3.8 cm, cuneate to obtuse at base, serrate at margins, acutely acuminate at apex, coriaceous; veins raised above, brochidodromus, 15–16 pairs of secondaries at 45°–60°. **Inflorescences** axillary or cauline, flowers 3–6 in fascicles, puberulous; inflorescence bracts closely alternate; pedicels slightly obconical, 1.8–2 cm long, puberulous; pedicellar bract 1, deltoid, ca. 1 × 1 mm, scaly, caducous; bracteoles 2, opposite, linear, ca. 1 × 0.5 mm, similar to bract. **Calyx** ca. 5 × 2.5 mm, puberulous; lobes ovate-triangular, ca. 3.5 × 2 mm, acuminate at apex. **Corolla** tubular, 2.5–2.8 × 0.8–1 cm, puberulous; lobes triangular, ca. 1 × 0.5 mm, acuminate at apex. **Stamens** 10, in 2 whorls, ca. 2.5 cm long; filaments spathulate, 2–2.5 mm long, slightly incurved, puberulous to pilose outside; anthers 1.8–2.2 cm long including 4.5–5.5 mm long thecae, granular, tail obscure and tubules 1.4–1.6 cm long, sparsely granular, calcarate, spurs ca. 1 mm long, linear, reflexed. **Style** slender, 2.5–2.7 cm long; stigma truncate. **Fruit** not seen.

*Distribution.*—India: Mizoram.



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FIG. 4. *Agapetes odontocera* (Wight) Hook. f. var. *mizoramensis* Banik & Sanjappa: a. habit; b. flower; c. calyx and style. Scale bars: a = 1 cm; b-c = 5 mm (a-c, B.M. Wadhwa & D.K. Singh 96834).

*Flowering*.—May.

*Etymology*.—This variety is named after the type locality.

*Notes*.—This variety differs from the typical variety in having uniformly puberulous inflorescences whereas the typical variety has totally glabrous inflorescences. Variety *mizoramensis* is recorded from Mizoram whereas the typical variety is widely distributed in Arunachal Pradesh, Assam, Meghalaya, Mizoram, Manipur and Nagaland.

**5. *Agapetes salicifolia*** C.B. Clarke var. ***glanduliflora*** Banik & Sanjappa, var. nov. (**Fig. 5**). TYPE: INDIA. ARUNACHAL PRADESH: Lower Dibang valley district, Mehao lake to Roing, 27 Nov 2000 (fl), *D.K. Singh & Party 9319* (HOLOTYPE: CAL; ISOTYPE: ASSAM).

A varietate typica inflorescentia glandulosopubescenti vel glandis subsessilibus in pedunculo, pedicellis, calyce et corollae costis differt.

**Epiphytic** shrubs, erect, 0.5–1 m tall. **Stems** robust, terete, 5–8 mm in diameter, striate, glabrous, lenticellate when mature; perulae 3–6, closely to loosely alternate, 1–4.5 × 1–1.2 mm, deltoid-ovate to linear-elliptic, entire to glandular at margins, acute to acuminate at apex; midnerve raised, glabrous, persistent. **Leaves**: pseudowhorls 5.5–8.5 cm apart, 8–9-leaved; petioles 4–8 mm long, glabrous, winged, slightly rugose outside, slightly pulvinus at base; lamina 6–16 × 1–2.5 cm, linear-elliptic, attenuate at base, entire at margins, acuminate at apex, coriaceous, glaucous above, pale below; veins slightly raised above, brochidodromous, 12–16 pairs of secondary veins, alternate at 30°–80°. **Inflorescences** axillary or cauline, corymbose, erect, 9–16-flowered, glandular hairy; peduncles dark red, 3.5–5.5 mm long, glandular hairy; peduncular bracts 3–6, closely alternate, broadly deltoid, obscure, glabrous, membranous, caducous; pedicels dark red, 4.5–7 mm long, striate, glandular hairy; pedicellar bract 1, 1–1.5 mm long, linear, persistent; bracteoles 2, linear, ca. 1 mm long, similar to bracts. **Calyx** dark red, 5–6.5 × 3.5–4.2 mm, glandular hairy or with subsessile glands; lobes ovate, 2.8–3.5 × 1.3–2.5 mm, acuminate at apex, membranous, veins raised above, glandular hairy. **Corolla** dark red to orange red, tubular-urceolate, 1.5–2 × 0.4–0.5 cm, angular, membranous, reticulate in dark red, secondary veins 5–6 pairs, at ca. 60°, midveins glandular hairy; lobes green or greenish-yellow, 1.5–2 × ca. 1.5 mm, ovate, acute to obtuse at apex, glandular hairy. **Stamens** 2-whorled, 1.5–1.8 cm long; filaments 2.5–3 mm long, linear, incurved, puberulous outside, hyaline; anthers 1.2–1.5 cm long including 5–5.5 mm long thecae, verrucate, tail bilobed, recurved and tubules ca. 10 mm long, glabrous. **Ovary** 3–3.5 mm in diameter, striate, glabrous; style slender, 1.7–1.9 cm long, ca. 1 mm deeply impressed inside ovary; stigma glandular capitate, 5-lobed, ca. 0.5 × 0.6 mm. **Fruit** a berry, globose, 4–6.5 × 4.5–5 mm, sparsely glandular hairy or with sessile glands. **Seeds** obovoid, 1–1.2 × 0.5–0.7 mm; seed coat reticulate.

*Distribution and Habitat*.—India: Arunachal Pradesh. Common in the subtropical forests between 1300 and 1400 m altitude.

*Flowering and Fruiting*.—October–November.

*Etymology*.—This variety is named for the glandular pubescence of inflorescence.

*Notes*.—This variety differs from the typical variety in having glandular hairy inflorescence or with subsessile glands on peduncles, pedicels, calyx and midveins of corolla whereas the typical variety has glabrous and eglandular inflorescence. Both varieties are distributed in Arunachal Pradesh.

PARATYPES: **INDIA. Arunachal Pradesh**: Lower Dibang valley district, Tiwari gaon to Roing, 1300 m, 3 Nov 2002 (fl), *D. Banik 27413* (CAL); Mehao lake to Baldi camp, 1400 m, 16 Nov 2002 (fl), *D. Banik 27432* (CAL); Lohit district, Hawa camp to Udayak pass, 1400 m, 24 Apr 2003 (fr), *D. Banik 27508* (CAL).

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FIG. 5. *Agapetes salicifolia* C.B. Clarke var. *glanduliflora* Banik & Sanjappa: a. habit; b. flower; c. calyx and style; d. stamen; e-h. peduncular bracts; i. t.s. of ovary. Scale bars: a = 2 cm; b-c = 5 mm; d = 3 mm; e-h = 2 mm; i = 1 mm (a-i, D.K. Singh & Party 9319).

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The acronym APFH is used in the text for The Herbarium, State Forest Research Institute, Arunachal Pradesh, Van Vihar, Chimpu, Itanagar 791 111, Arunachal Pradesh, India.

#### REFERENCES

- MABBERLEY, D.G. 1997. The plant book. 2<sup>nd</sup> ed. (Reprinted with corrections 1998, 2000). Cambridge University Press.
- RUIZHENG, F. and P.F. STEVENS. 2005. *Agapetes*. In: Editorial Committee, eds. Flora of China, vol. 14. Science Press, Beijing and Missouri Botanical Garden Press, St. Louis. Pp. 504–516.
- SANTAPAU, H. and A.N. HENRY. 1973. A dictionary of the flowering plants in India. (Reprinted in 1998). National Institute of Science Communication, New Delhi.